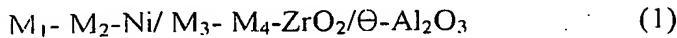


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CLAIMS

What is claimed is:

1. A modified Θ - Al_2O_3 -supported nickel reforming catalyst expressed by the following formula 1, which is used for producing synthesis gas mixture of carbon monoxide and hydrogen from natural gas,



wherein M_1 is an alkali metal; each of M_2 and M_3 is an alkaline earth metal; and M_4 is a IIB element or a lanthanide.

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2. A nickel reforming catalyst according to Claim 1, which is composed of 3-20 wt.% of nickel (Ni) against Θ - Al_2O_3 ; 0-0.2 molar equivalent of M_1 and 0-4 molar equivalent of M_2 cocatalysts against nickel; 0-1.0 molar equivalent of M_3 and 0.01-1.0 molar equivalent of M_4 against zirconium; and 0.01-1.0 molar equivalent of ZrO_2 against Θ - Al_2O_3 .

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3. A nickel reforming catalyst according to Claim 1, wherein said Θ - Al_2O_3 support is modified with modified zirconia ($\text{M}_3\text{-M}_4\text{-ZrO}_2$) through precipitation or sol-gel method.

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4. A nickel reforming catalyst according to Claim 1, wherein said nickel and cocatalyst ($\text{M}_1\text{-M}_2\text{-Ni}$) is supported on the modified support ($\text{M}_3\text{-M}_4\text{-ZrO}_2/\Theta\text{-Al}_2\text{O}_3$) through molten-salt or impregnation.

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5. A method for producing synthesis gas mixture of carbon monoxide and hydrogen from methane natural gas by steam reforming, oxygen reforming or steam-oxygen reforming, wherein a catalyst selected from Claims 1 to 4 is used; methane-to-steam molar ratio is 0-6; methane-to-oxygen molar ratio is 0-1; reaction 5 temperature is 600-1000°C; reaction pressure is 0.5-20 atm; and space velocity is 1,000-1,000,000cc/hr·g-cat.

6. A producing method of synthesis gas from natural gas according to Claim 5, wherein: for steam reforming, methane-to-steam molar ratio is 1-6; for oxygen 10 reforming, methane-to-oxygen molar ratio is 0.1-1; and for steam-oxygen reforming, methane-to-steam molar ratio is 1-5 and methane-to-oxygen molar ratio is 0.1-1.